

# Stories from the Sharp End: Case Studies in Safety Improvement

DOUGLAS MCCARTHY and DAVID BLUMENTHAL

*Issues Research; Massachusetts General Hospital/Partners Health System*

Motivated by pressure and a wish to improve, health care organizations are implementing programs to improve patient safety. This article describes six natural experiments in health care safety that show where the safety field is heading and opportunities for and barriers to improvement. All these programs identified organizational culture change as critical to making patients safer, differing chiefly in their methods of creating a patient safety culture. Their goal is a safety culture that promotes continuing innovation and improvement, transcending whatever particular safety methodology is used. Policymakers could help stimulate a culture of safety by linking regulatory goals to safety culture expectations, sponsoring voluntary learning collaborations, rewarding safety improvements, better using publicly reported data, encouraging consumer involvement, and supporting research and education.

**Key Words:** Patient safety, quality of care, organizational culture, delivery of health care.

IN ANY SUCCESSFUL EFFORT TO CREATE SOCIAL CHANGE, innovations proliferate, outpacing the ability of the scientific process or the published literature to assess and report their results. This is certainly true of the safety improvement effort in the U.S. health care system at the current time. Motivated by governmental and nongovernmental regulators, pressure from their staffs and patients, and their own wish to do the right thing, leaders of health care organizations around the country are introducing programs to improve patient safety. Many

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*Address correspondence to:* David Blumenthal, Institute for Health Policy, Massachusetts General Hospital, 50 Staniford Street, 9th Floor, Suite 901, Boston, MA 02114 (email: [dblumenthal@partners.org](mailto:dblumenthal@partners.org)).

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of these are not being evaluated and probably never will be studied with the rigor that academicians would like. Yet when properly interpreted, the histories of these programs may offer valuable insights into where the safety field is heading and opportunities for and barriers to improvement. With this in mind, we conducted case studies of ten potentially promising examples of safety improvement programs in health care institutions around the country. This article briefly reports the characteristics and lessons of six of these ongoing natural experiments in health care safety (see Table 1 for an overview of the cases).

To choose our cases, we contacted recognized leaders in the patient safety field and asked them which institutions were, in their view, doing the most exciting work in the patient safety field. Among our informants were individuals from the Institute for Healthcare Improvement, the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO), research funders, and academicians who study patient safety. These informants identified more than twenty potential cases, of which we selected ten for closer study that we considered the most interesting and promising for broad application. We present here six unique cases for analysis; the other four cases describe similar interventions. A fuller description of all ten cases and a list of those persons whom we consulted can be found at the Commonwealth Fund website ([www.cmwf.org](http://www.cmwf.org)). We collected the information presented in these cases through telephone interviews and written communications with leaders in each organization and from a review of relevant publications (sources are listed in Table 1). We conducted our fieldwork in the fall of 2004. A brief version of our findings was presented on November 4, 2004, at a conference sponsored by the Commonwealth Fund of New York City to mark the fifth anniversary of the publication of *To Err Is Human*, the Institute of Medicine's seminal report on the patient safety issue.

We should mention at the outset some of the limitations of our work. Our methods were intended to capture a snapshot of the key accomplishments of leading organizations and to synthesize the self-perceived learning of their internal change leaders. Our findings are not meant to be representative of all health care organizations. The cases pertain to the hospital setting, because to date that has been the focus of most patient safety improvement efforts. We did not examine expensive high-technology innovations, such as computerized physician order entry systems, because we wished to concentrate on approaches that would be broadly applicable, regardless of an institution's ability to make large

TABLE 1  
Case Study Sites, Context, and Sources

Organization	Setting	Intervention	Sources (Interviews and Publications)
Sentara Norfolk General Hospital (SNGH), Norfolk, Va.	A 569-bed, level I trauma center, one of six hospitals operated by Sentara Healthcare, a regional integrated health care delivery network.	Accelerate patient safety improvement through a multifaceted culture change program involving setting and monitoring behavioral expectations, enhancing analytic capabilities, and streamlining and focusing on critical policies.	Gary Yates, MD, vice president, clinical effectiveness, Sentara Norfolk General Hospital, and executive medical director for clinical effectiveness, Sentara Healthcare; Kerry Johnson, senior partner, Performance Improvement International; Runy 2004; Yates et al. 2004.
U.S. Dept. of Veterans Affairs (VA), National Center for Patient Safety, Ann Arbor, Mich.	The nation's largest integrated health care system, providing care to 5.1 million veterans and 7.6 million enrollees at more than 1,300 sites nationwide.	Lead organizational cultural change by empowering local facilities and frontline staff with proven tools, methods, and initiatives for patient safety improvement.	James Bagian, MD, director of the VA National Center for Patient Safety; Linda Connell, MA, RN, director of the NASA/VA Patient Safety Reporting System; Bagian et al. 2001, 2002; DeRosier et al. 2002; Heget et al. 2002; Neily 2003; Perlin, Kolodner, and Roswell 2004; VHA 2002; Weeks and Bagian 2000.

(Continued)

TABLE 1—Continued

Organization	Setting	Intervention	Sources (Interviews and Publications)
Kaiser Permanente (KP), Calif.	KP Anaheim Medical Center, Orange County, Calif., and four northern California KP medical centers of an integrated group model HMO that enrolls 8.2 million people nationally.	Initiate an operating room safety briefing and a multicenter perinatal patient safety project as part of a program of organizational learning to promote effective teamwork and communication among teams working in high-risk areas.	Michael Leonard, MD, KP physician leader of patient safety; James DeFontes, MD, physician director of surgical services, KP Orange County; Julie Nunes, RN, MS, director of risk management, KP Northern California region; Paul Preston, MD, assistant chief of quality, KP San Francisco Medical Center; DeFontes and Surbida 2004; Leonard, Graham, and Bonacum 2004; Leonard, Graham, and Taggart 2004; Preston et al. 2004; McFerran et al. 2005; Nunes and McFerran 2005.
Missouri Baptist Medical Center, St. Louis, Mo.	A 489-bed acute care hospital within BJC HealthCare, a health system comprising 13 hospitals and other facilities.	Establish a rapid response team capability to intervene early with patients showing signs of medical deterioration before they suffer acute crises.	Nancy Sanders, RN, performance improvement coordinator for Missouri Baptist Medical Center; John Krettek, MD, vice president of medical affairs; Cohen, Eustis, and Gribbins 2003.

Johns Hopkins Hospital, Baltimore, Md.	A 14-bed oncology surgical ICU and a 15-bed surgical ICU within a 900-bed academic medical center, one of three acute care hospitals in the Johns Hopkins Health System.	Implement a comprehensive unit-based safety program that empowers staff to identify and eliminate patient safety hazards following eight action steps.	Peter Pronovost, MD, PhD, associate professor of anesthesiology and critical care medicine, surgery, nursing, and health policy and management at Johns Hopkins University and medical director of the Johns Hopkins Center for Innovations in Quality Patient Care; Berenholtz et al. 2004; Berman 2004; Niedowski 2003; Paine et al. 2004; Pronovost and Berenholtz 2004; Pronovost et al. 2003, 2005.
OSF St. Joseph Medical Center, Bloomington, Ill.	A 165-bed acute care hospital, part of OSF HealthCare, a six-hospital integrated healthcare network based in Peoria, Ill.	Reduce adverse drug events by improving the process of medication reconciliation, the safe use of high-risk medications, and the reliability of medication dispensing.	Kathy Haig, RN, director of quality resource management, risk manager, and patient safety officer for OSF St. Joseph Medical Center; John Whittington, MD, patient safety officer and director of knowledge management for OSF Healthcare System; Haig 2003; Whittington and Cohen 2004.

*Note:* Additional background information on the topics and cases is available from the Commonwealth Fund website ([www.cmf.org](http://www.cmf.org)).

capital investments. Reliance on a small number of key informants means that the cases present a necessarily circumscribed perspective from which it is not possible to critically examine organizational dynamics or test theoretical models. Hence, our work should be considered only a starting point for more detailed organizational analyses.

One overriding lesson of our work has emerged. All the programs we examined cited cultural change—the creation of a “patient safety culture”—within their organizations as critical to making patients safer. Thus the organizations seemed to differ chiefly in the methods they were using to create this safety culture. Some were trying to change culture directly. Others were using less direct methods by relying on particular reforms in the structure or process of care, such as promoting teamwork to improve safety vigilance or introducing methods to reduce variability in the processes of care, and hoping that attitudes would change as behavior changed. Some were using both direct and indirect approaches. But regardless of means they chose, our study organizations shared the goal of cultural reform.

The fact that real organizations undertaking real change are focusing on culture in this way is both reassuring and sobering. As we shall see, the published literature on safety improvement in health care and other fields emphasizes the centrality of organizational culture in developing high-reliability organizations, institutions that are resistant to catastrophic failures that injure clients or patients (Roberts 1993; Weick 1987). Thus it is encouraging that in the health care field, which has come late to the safety movement, this important insight is taking root so quickly, at least in the pioneering organizations. At the same time, the fact that changing the culture lies at the foundation of safety improvement is sobering because there is as yet no proven formula or well-trod path for creating cultural change in health care organizations. Cultural change efforts are also extremely hard to study because culture is difficult to measure reliably and changes seem to occur incrementally and unpredictably in organizations. The lack of a clear road map for cultural change and the very elusiveness of safety culture as a destination make this a particularly daunting goal for leadership to set. Yet leadership commitment, our cases suggest, is essential to success. One function of our cases may be to assure leaders who are taking personal and organizational risks to create a safety culture that they are in good company and to offer ideas and examples that they can take back to their own institutions.

Our article has four parts. First, because the concept of safety culture is central to understanding what currently is happening at the forefront of safety improvement, we briefly review the topic of patient safety culture. Second, we provide abbreviated versions of six of the cases we examined. Third, we analyze the attributes of the safety culture acquired by these organizations. Finally, we provide concluding lessons, observations, and policy implications. Table 1 provides an overview of the case study organizations, and Table 2 defines the key terms we use.

### Safety Culture: Its Importance, Definition, and Attributes

In *To Err Is Human*, the Institute of Medicine noted that “a strong culture of safety . . . is viewed by many in the safety field as being the most critical underlying feature of their accomplishments” (IOM 1999, 160). Likewise, a review of several high-profile patient safety failures occurring internationally in health care organizations found that “preventing future failures depends on cultural as much as structural change in health care systems and organizations” (Walshe and Shortell 2004, 103). Certain prevailing aspects of health care’s organizational and professional culture, such as steep authority hierarchies and a lack of teamwork, an unwillingness to acknowledge human fallibility, and the tendency to punish rather than learn from error, can act as barriers to patient safety and its improvement (Akins and Cole 2005; Sexton, Thomas, and Helmreich 2000; VanGeest and Cummins 2003).

The IOM recommended that health care organizations “develop a culture of safety such that an organization’s design processes and workforce are focused on a clear goal—dramatic improvement in the reliability and safety of the care process.” To achieve this goal, “safety must be an explicit organizational goal that is demonstrated by clear organizational leadership and professional support” (IOM 1999, 166).

Although organizational safety culture has no one agreed-upon definition, one used in the nuclear power industry is helpful:

Safety culture is the product of individual and group values, attitudes, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of an organization’s health and safety programmes. Organizations with a positive safety culture are

TABLE 2  
Definition of Key Terms

Adverse Event	An injury caused by medical management rather than the patient's underlying condition. A preventable adverse event is an adverse event attributable to an error or system failure (IOM 1999, 28).
Close Call or Near Miss	An event or situation that could have resulted in an accident, injury, or illness but did not, either by chance or through timely intervention (QuIC 2000).
Crew Resource Management Training	Considers human performance limiters (such as fatigue and stress) and the nature of human error, and it defines behaviors that are countermeasures to error, such as leadership, briefings, monitoring and cross checking, decision making, and review and modification of plans (Helmreich 2000, 783).
Error	Failure of a planned action to be completed as intended or use of a wrong plan to achieve an aim (IOM 1999, 28; Reason 1990, 9).
Failure Modes and Effects Analysis	A systematic, proactive method for evaluating a process to identify where and how it might fail and to assess the relative impact of different failures in order to identify the parts of the process that most need change (IHI 2005a).
High Reliability Organization	Highly complex, technology-intensive organizations that must operate, as far as humanly possible, according to a failure-free standard (Reason 1997, 213).
Human Factors	The study of the interrelationships among humans, the tools they use, and the environment in which they live and work (IOM 1999, 63).
Patient Safety	Freedom from accidental injury or, more broadly, avoiding injuries to patients from the care that is intended to help them (IOM 1999, 58; 2001, 5).
Root Cause Analysis	A structured process for identifying the causal or contributing factors underlying adverse events or close calls (AHRQ 2005).
Situational Awareness	Refers to the degree to which one's perception of a situation matches reality, including awareness of fatigue and stress among team members (including oneself), environmental threats to safety, appropriate immediate goals, and the deteriorating status of the crisis or patient (AHRQ 2005).
System	A set of interdependent elements interacting to achieve a common aim. These elements may be both human and nonhuman (equipment, technologies, etc.) (IOM 1999, 52).



characterized by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures. (ACSNI 1993, quoted in IAEA 2002, 14)

Based on research on human error and the ways that organizations have achieved or failed to achieve safety, James Reason (1997) and other experts (Helmreich and Merritt 1998; IAEA 2002) contend that organizations can create a safety culture by identifying and consistently applying practical measures associated with enhanced safety. Changes often begin at the level of the unit or work group, both to test approaches before using them more widely and, given limited resources, to narrow the scope of work. Surveys of safety cultures reveal that an organization's culture varies within units of the same hospital (Sexton 2005). Hence, changing the local culture might require tailoring improvements to the specific local working environment.

As far as we know, no health care organization as yet can offer a model of what other health care institutions should strive to achieve in their safety culture. Accordingly, health care leaders must determine their own objectives. In our view, this makes it all the more important that institutions share their aspirations, efforts, progress, and disappointments in as close to real time as possible. To help analyze what case study organizations have learned, we examined the cases using a framework developed by James Reason (1997), which defines five interrelated attributes for a safety culture: an informed culture, a reporting culture, a just culture, a flexible culture, and a learning culture (see Table 3 for definitions). These attributes have been used to describe the development of a safety culture in other industries and sectors such as nuclear power generation, oil and gas extraction and refining, and commercial and military aviation (Hudson 2003; Reason 1997). The IOM's reliance on Reason's work has made it a touchstone for the patient safety movement, and several of our informants cited these attributes when describing their own work.

Before presenting the cases, we call attention to an important distinction: several of the cases describe their results as observed or reported numbers of events, which may differ from the number that actually occurred. The fact that errors and their consequences may not be immediately obvious to patients and caregivers is one reason that the health care field lags in pursuing safety. Although medicine has a strong tradition of professional concern for patients' welfare, the complexity of

TABLE 3  
Five Attributes of a Safety Culture

Attribute	Definition
An Informed Culture	"Those who manage and operate the system have current knowledge about the human, technical, organizational and environmental factors that determine the safety of the system as the whole."
A Reporting Culture	"An organizational climate in which people are prepared to report their errors and near-misses."
A Just Culture	"An atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information—but in which they are also clear about where the line must be drawn between acceptable and unacceptable behaviour."
A Flexible Culture	"Adapting effectively to changing demands. . . . [I]n many cases it involves shifting from the conventional hierarchical mode to a flatter professional structure, where control passes to task experts on the spot."
A Learning Culture	"The willingness and the competence to draw the right conclusions from [the organization's] safety information system, and the will to implement major reforms when their need is indicated."

Source: Reason 1997, 195–96, 213.

modern systems in which health care professionals perform their work means that they are often unable to see the safety implications of their human and technological interactions. The goal of patient safety is to rectify this system "blindness" by providing the means to detect and eliminate or mitigate system vulnerabilities that could harm patients.

## Case Studies

*Sentara Norfolk General Hospital.* Beginning in 2002, Sentara Norfolk General Hospital (SNGH), in Norfolk, Virginia, tried to improve patients' safety by strengthening its organizational culture of safety. Despite a record of successful technology and process improvements,

the hospital's leaders were frustrated that the overall pace and scope of organizational change was not greater. Although changes in culture were deemed the best strategy for improving safety, the lesson of other industries was not to focus on the organization's culture itself but to make safe behaviors a regular practice (Krause, Seymour, and Sloat 1999). To help in this effort, SNGH retained industrial consultants with a reputation for safety improvement in the nuclear power and manufacturing industries.

The consultants conducted a baseline organizational assessment and suggested four strategies to promote safety-related behaviors:

1. Develop for all hospital staff, physicians, and hospital leaders three sets of behavior-based expectations (BBEs) linked to techniques for preventing errors (e.g., communicate clearly by using repeat-backs and clarifying questions).
2. Establish "red rules" (high priority rules) to focus employees' attention on the potential for harm if certain critical safety procedures are not followed exactly (e.g., positive identification before taking any action with a patient, verifying the site before surgery).
3. Improve the staff's ability to conduct timely and rigorous "root cause analysis" (see Table 2 for definition) of major safety events, such as by identifying the common contributing causes of a series of events, so that these analyses identify long-lasting, systems-oriented change.
4. Adopt a human factors approach to simplifying policies and procedures (e.g., using a checklist to identify and standardize the principal steps in a process).

A "grassroots" group of employees developed the hospital staff and leadership BBEs, and another group of physicians and nurses created the physician BBEs. The groups also reviewed and adapted proven error management behaviors, tools, and techniques from other high-risk industries to fit the health care environment.

To help make expected behaviors become habits, supervisors regularly offer feedback on BBEs, which serve as core competencies for staff performance reviews. Managers informally observe progress when they make walk rounds in hospital units. Trained observers from the hospital's clinical effectiveness department use validated tools adapted from other high-risk industries to determine whether opportunities for applying

behaviors are handled appropriately at critical safety junctures, such as during shift-change reports. These observations form the basis for measuring overall organizational progress on BBEs through a system called Real-Time Behavior-Based Monitoring, which is one of the several safety-related measurements in the hospital's integrated performance indicator system.

The preliminary results of these efforts include a 42 percent increase in the use of expected communications behaviors by hospital staff from 2003 to 2004, an 84 percent reduction in ventilator-associated pneumonias from 2001 to June 2004, and a 63 percent decrease in the rate of device-associated bloodstream infections from 2002 to June 2004. Based on SNGH's experience, Dr. Gary Yates, vice president and medical director of clinical effectiveness, said that health care leaders need to exhibit "measured impatience" if they want to see breakthroughs in patient safety and move to the next level of organizational performance.

*U.S. Department of Veterans Affairs.* The Veterans Health Administration, a component of the U.S. Department of Veterans Affairs (VA), established its National Center for Patient Safety in 1999 to lead the change in the organizational culture by empowering local facilities and frontline staff with proven tools, methods, and initiatives to improve patients' safety. This culture change program used human factors principles and the experience and lessons from high-reliability industries such as aviation and nuclear power. It was initiated as part of a broader organizational transformation undertaken by the VA in response to public and congressional concerns about the quality of care in VA facilities. The safety program's main components were:

- Establishing a nonpunitive approach to patient safety that protects the confidentiality of those who report unintended errors, which are clearly distinguished from blameworthy acts. With the cooperation of Congress, its unions, and the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO), the VA defined a blameworthy act as a criminal act, an act related to alcohol or substance abuse or patient abuse, or an intentionally unsafe act that an individual knew to be unsafe. Such acts are reported to the local facility administration for investigation and possible disciplinary action.
- Encouraging the reporting of both adverse events and close calls (see Table 2 for definitions). VA employees are asked to report safety

events to their facility's patient safety manager. The employee who makes these internal reports remains "identified" until the root cause analysis is completed so that the employee can be notified of and comment on the findings. If an employee is not comfortable reporting internally, he or she may report a safety event to an external reporting system operated by the NASA Ames Research Center on the VA's behalf. This external patient safety reporting system is modeled on the Aviation Safety Reporting System, which NASA operates for the Federal Aviation Administration. Employees making external reports are asked to identify themselves so that they can be contacted if additional information is needed, but the reports are subsequently "de-identified." In this way, the external system protects the employees' anonymity.

- Designing and providing training on easy-to-use, computer-aided root cause analysis tools and cognitive aids for multidisciplinary teams of frontline staff to analyze reported safety events in each facility. The goal is to determine what happened, why it happened, and what can be done to prevent it from happening again. The National Center analyzes similar events to decide how to address common issues throughout the system.
- Adapting a systems engineering tool, known as "failure modes and effects analysis" (see Table 2 for definition), to discover critical system vulnerabilities and to design and assess improvements that will prevent and reduce harm to patients.
- Disseminating throughout the VA warnings about potential safety threats and lessons learned about effective system improvements.

Within ten months of enhancing its internal patient safety reporting system in 1999, the VA experienced a thirtyfold increase in the reporting of events, indicating that the promise of confidential, nonpunitive reporting was important to the workforce. The relatively small number of reports received by the external reporting system (fewer than four hundred since its inception in 2002, compared with hundreds of thousands of safety events reported internally) suggests that the VA has achieved a high level of trust in its internal reporting system. Since the creation of enhanced tools and training, nearly all root cause analyses have been able to recommend a solution, whereas previously about half the reviews of patient safety events failed to identify a solution—a 100 percent increase in the perceived preventability of events. In addition, the types of root

causes identified have shifted from patients' behavior and professional training to human factors and systems issues, leading to what managers regard as more effective and sustainable solutions. These trends suggest that teams no longer consider the circumstances giving rise to errors as impossible to change. One measure of the change in the VA's culture is that its personnel seem to be applying what they have learned about systems thinking to other areas, and they want to set and achieve safety goals that exceed the JCAHO's accreditation requirements, said Dr. James Bagian, director of the VA National Center for Patient Safety.

*Kaiser Permanente.* Kaiser Permanente (KP) instituted a program of organizational learning in 2002 to promote teamwork and communication in high-risk areas such as surgery and labor and delivery. Clinical leaders were taught safety-oriented principles and techniques adapted from the U.S. Navy and from airline crew resource management training (Helmreich 2000) (see Table 2 for definition).

At the KP Anaheim, California, Medical Center, a multidisciplinary team designed a preoperative safety briefing to enhance basic patient safety practices required by the JCAHO, such as the "time out" to verify surgical sites. A one-page checklist was created to prepare team members for cases, including practices to assess and mitigate safety risks. Analogous to the preflight checklist used in the airline industry, this checklist is adapted to the needs of each case and is posted throughout the operating theater as a reminder. Operating room personnel are periodically trained in human factors principles, followed by a short self-assessment for reinforcement.

Four northern California KP medical centers piloted a perinatal patient safety project (PPSP) in which they received training on safety sciences and instituted improvements to close local gaps in the characteristics of a high-reliability perinatal unit (Knox, Simpson, and Garite 1999). The principal interventions were:

- Multidisciplinary patient rounds to ensure that the care plan was understood.
- Assertive and structured communication techniques to promote accurate situational briefings (such as when interpreting and responding to fetal distress).
- A communication escalation policy defining how safety concerns can be forwarded through the chain of command to avoid delays in responding to critical events.

- Team briefings before a procedure and debriefings following an adverse outcome.

A multidisciplinary team developed a critical-event team-training program to practice teamwork and communication skills in simulated crisis situations using computerized mannequins. Complex training scenarios are based on actual cases that force the team to recover from errors. Drills are videotaped for debriefing, during which the team sees where improvement is needed.

After a six-month trial of preoperative briefings at the Anaheim Medical Center, no wrong-site surgeries were reported (three were reported in the previous year, but the small number of events means that no firm conclusions can be drawn). At the same time, other reported error management behaviors increased, such as a willingness to speak up about safety concerns and to report and discuss mistakes, suggesting that team members had better “situational awareness” (see Table 2 for definition). Comparing responses to the University of Texas Safety Attitudes Questionnaire (Sexton et al. 2004) made before and after the intervention indicates that operating room staff perceived an improvement in the safety culture and teamwork. The turnover rate among nurses fell by two-thirds (from 23 percent to 7 percent) and has been sustained at a lower level than that in comparison contract hospitals. One year following the implementation of the PPSP, the labor and delivery staff in all four perinatal sites rated the safety culture more highly than before the intervention. (Several years of data will be required to measure the effect of the PPSP on perinatal adverse events.)

Briefings are a powerful way to change the way that people think about and practice teamwork, said Dr. James DeFontes, physician director of surgical services for KP Orange County. Explicit communication helps people attend to the task at hand, bridges cognitive gaps in training and experience levels, and avoids unjustified assumptions about others’ knowledge, he added. Improving team communication is, ultimately, about organizational cultural change. Effective change requires a “bottom-up approach” supported by leadership and physician involvement, combined with ways of inculcating expected behaviors in everyday practice, Dr. Michael Leonard, physician leader for patient safety at Kaiser Permanente, said.

*Missouri Baptist Medical Center.* Missouri Baptist Medical Center, in St. Louis, tried to improve patient outcomes by enhancing its existing

emergency response capability to intervene early with patients showing signs of medical deterioration before they suffered crises such as cardiac or respiratory arrest. The hospital's leaders were impressed by the benefits of rapid response teams (also known as medical emergency teams) in reducing adverse events in Australian hospitals (Bellomo et al. 2003, 2004) and a few institutions in the United States (IHI 2004a). In 2004, they made a similar effort in their hospital. Ideas for their plan were obtained from collaboration with the Institute for Healthcare Improvement and from the experience of other adopters. The intervention was carried out during an organization-wide culture change initiative aimed at aligning the hospital's mission, structure, reward system, and leadership with patient safety goals and building a partnership with affiliated physicians to institute safety improvements.

Missouri Baptist's rapid response team consists of a physician assistant acting as the team leader, a critical care nurse, and a respiratory therapist. The team is empowered to take whatever action is needed to stabilize the patient, within the scope of their practices, while reporting to and consulting with the hospital's ICU physician intensivist as needed. The patient's attending physician is notified and informed of the team's assessment and may order additional tests at his or her discretion. Patients are transferred to the ICU or to an intermediate care unit when appropriate.

The hospital staff were taught the purpose and use of the rapid response team before it was put in place, a step that the hospital's leaders considered necessary to its success. Specific clinical criteria were compiled to guide the nursing staff in deciding when a patient's condition warranted calling for help. In addition, anyone could call for help when he or she was simply worried or concerned about a patient. The benefit of the rapid response team was reinforced by sharing stories of successful interventions.

After two months of full implementation, calls for the rapid response team steadily increased to about seventy to eighty per month, indicating that the floor nurses recognized the value of this safety resource. During this time, there was a 60 percent decrease in emergency calls for respiratory arrest and similar crises and a 15 percent decrease in cardiac arrests, suggesting that these acute crises were being averted through early intervention. Anecdotal feedback from family members indicated they were impressed and gratified by efforts made on behalf of the patients, according to Nancy Sanders, the hospital's performance improvement coordinator.



A rapid response team should be considered a support resource for frontline staff, observed Dr. John Krettek, vice president of medical affairs. Incidents can be used as a teaching opportunity for the ICU nurse to share insights into the case so that the floor nurse can sharpen his or her assessment skills and learn how to respond to a similar event in the future. In this way, rapid response teams may promote a culture of safety by building teamwork and spreading knowledge and skills throughout the hospital.

*Johns Hopkins Hospital.* In 2001, intensive care unit (ICU) physicians and staff at the Johns Hopkins Hospital in Baltimore developed its Comprehensive Unit-Based Safety Program (CUSP) as a framework for quality improvement that can be tested, adapted, and introduced sequentially in the hospital units. This program is part of a broader institutional commitment to improve patient safety that was partly based on a partnership with the family of a pediatric patient, Josie King, who was a victim of medical error at the hospital. The King family donated funds and worked with Hopkins physicians to create a patient safety program in the hospital's Children's Center, which has served as a model for improvement.

CUSP has eight steps: to (1) assess the unit's culture of safety, (2) educate staff about safety sciences such as systems thinking, (3) identify safety concerns, (4) meet regularly with a senior hospital executive who supports the removal of system barriers, (5) prioritize and implement improvements, (6) document and analyze results, (7) share success stories, and (8) reassess the unit's safety culture.

Improvement teams (consisting of a physician, nurse, and administrator, plus other staff who wished to join) spent time each week (four to eight hours) identifying and promoting safety improvement efforts. For example, a short-term patient goals form was drawn up based on a survey finding that nursing staff and residents frequently did not know the goals of patients' therapy. The form is used as a checklist during physician-led rounds to identify tasks that need to be completed by the care team and to identify and mitigate safety risks. A related project aimed to reduce bloodstream infections associated with the use of central venous catheters, which are often inserted in ICU patients to provide medication, nutrition, and fluids. A multidisciplinary team decided on the following interventions:

- Require providers to receive education about evidence-based infection control practices and successfully complete a posttest as a precondition to inserting catheters.

- Supply a catheter insertion cart with standardized supplies needed to meet infection control guidelines for the sterile insertion of catheters.
- Follow a checklist to ensure adherence to evidence-based guidelines for safe catheter insertion.
- Empower nurses to intervene if guidelines are violated.
- Add an item to the daily goals sheet that prompts the ICU team to ask physicians daily during patient rounds whether catheters can be removed.

After the daily goals sheet was introduced, self-reported understanding of goals of care increased from 10 percent to 95 percent of residents and nurses during an eight-week period. One year following the implementation of the CUSP initiative, the average ICU length-of-stay fell by one day in one ICU and by two days in a second ICU. Medication errors were eliminated in orders to transfer patients out of the ICU. The proportion of the ICU staff who gave positive ratings of the safety culture rose by nearly half in one ICU and nearly doubled in the other, as measured on the Safety Climate Scale (Sexton and Thomas 2003). Senior executives' involvement with the ICU led to structural changes, including the creation of specialized patient transport teams and the presence of pharmacists in ICUs. Documented catheter-related bloodstream infections were eliminated, preventing an estimated forty-three infections and eight deaths and saving an estimated \$2 million annually.

CUSP is now being used as a framework for patient safety improvement throughout Johns Hopkins Hospital. Initiating change efforts within a single work unit and then replicating successful approaches in other units appears to be a promising approach to building an organizational culture of safety in the Hopkins system. "When you create a system that reliably delivers the processes or interventions that work, spectacular performance improvement follows," Dr. Peter Pronovost, medical director of the Johns Hopkins Center for Innovations in Quality Patient Care, said in a recent interview for the *Joint Commission Journal on Quality and Safety* (Berman 2004, 663).

*OSF St. Joseph Medical Center.* OSF St. Joseph Medical Center, in Bloomington, Illinois, used several strategies to promote an organizational safety culture: the widespread reporting of errors, systems thinking about preventing errors, and collaborating for improvement. Many ideas were derived from participation in the Institute for Healthcare

Improvement's Quantum Leaps in Patient Safety collaboration, which the hospital joined in 2001. For example, safety concerns and ideas for improvement are elicited from nursing staff during safety briefings at shift changes and through executive walk rounds (Frankel et al. 2003), during which hospital executives periodically meet with frontline staff in each of the hospital's work units.

For its first patient safety effort, the hospital instituted several ways of reducing medication errors. An enhanced medication reconciliation process was established as the foundation for preventing adverse drug events (Rozich and Resar 2001). This process had the following steps:

- A nurse interviews the patient or the patient's advocate at hospital admission to obtain the best possible information about home medication use.
- When patients are transferred between hospital units or discharged from the hospital, their existing medications are compared with those ordered by the physician to be continued.
- Any discrepancy between medications ordered and currently being taken at hospital admission, transfer, or discharge must be reconciled by the patient's physician within four to twenty-four hours, depending on the type of medication.
- A pharmacist reviews the patient's home medication use and the physician's orders to detect and avoid any medication errors in dosing or other problems such as potential drug interactions.

An automated standard medication reconciliation sheet doubles as the medication order sheet for review and approval by the physician at admission, transfer, and discharge, which saves time and prevents transcription errors. A duplicate copy is given to the patient to take home, and another copy is sent to the patient's referring physician.

Other improvements in the medication process used human factors principles, such as standardized order sets and dosing services for certain high-risk medications, to reduce complexity and unnecessary variation that could lead to errors and harm to the patient. Pharmacists on nursing units perform independent double checks while entering medication orders, which permits them to detect dosing errors or potential drug interactions and to immediately contact physicians for resolution. A systematic risk assessment (known as "failure modes and effects analysis," see Table 2 for definition) is used to identify vulnerabilities in the medication-dispensing process and to design countermeasures. For

example, to prevent the reuse of leftover medication, the floor nurse places it in a plastic bag, which is picked up by pharmacy technicians during hourly rounds on the floor. The telephonic Adverse Drug Event Hotline was instituted to simplify reports of adverse drug events and permit pharmacists to analyze potential problems each day.

Following these interventions, the rate of adverse drug events dropped by 91 percent (from 5.8 to 0.5 per 1000 doses) from June 2001 to May 2003, as detected using a “trigger tool” for sampling medical records developed by the Institute for Healthcare Improvement (IHI 2004b). The hospital’s perceived safety culture also improved, as measured using the University of Texas Safety Climate Survey (Sexton and Thomas 2003).

## Discussion: Acquiring a Safety Culture

The cases illustrate how health care organizations are working to instill the five characteristics of high-reliability safety culture identified by James Reason (1997) and defined in Table 3. They are seeking, first of all, to become *informed* about system vulnerabilities that threaten patients’ safety so that they can plan and prioritize system improvements. Sentara Norfolk General Hospital and OSF St. Joseph Medical Center, for example, have integrated performance indicator systems that track progress in meeting safety goals by measuring safety-related attitudes, behaviors, events, risks, and outcomes using multiple data sources such as surveys, assessments, incident reports, direct observation, medical records, and malpractice claims. At the apex of this system, executives at these hospitals make walk rounds on hospital wards to cultivate an awareness of safety issues and demonstrate to the staff that safety is important. The kind of top-to-bottom organizational safety audit conducted by Sentara Norfolk General Hospital appears to be a valuable but underused resource for detecting weaknesses and opportunities for improvement.

To support an informed culture, case study organizations encourage the *reporting* of safety incidents and concerns (including near misses or close calls) through internal and external reporting systems, safety briefings, and executive walk rounds. They appear to have moved beyond a superficial preoccupation with the volume of reports as a barometer of safety culture to a more mature outlook that values reports for the learning that they enable when accompanied by effective analytic tools. For example, insights obtained by analyzing close calls, which occur more

frequently than adverse events, can be used to discover weaknesses in the system before they harm patients. To encourage participation and build trust in the efficacy of reporting, case study organizations have established feedback loops to discuss with both management and front-line staff what they are learning and doing as a result. Although several organizations use anonymous reporting systems, the experience of the Veterans Health Administration suggests the feasibility of a confidential reporting system in which incident reporters identify themselves so that they can be included directly in the feedback loop.

These organizations recognize the necessity of providing a psychologically safe environment for reporting medical errors so that mistakes can be identified, learned from, and prevented rather than hidden out of fear of punishment. Some have characterized this as a “blame-free” environment for patient safety. Others have more carefully defined their aspiration as a nonpunitive, or *just culture*, that protects the reporting of honest errors while recognizing that misconduct—in which an individual intentionally endangers patients—is not an error (Leape 2005). The Veterans Health Administration, for example, found that its employees were willing to greatly increase the reporting of safety incidents under a credible promise of confidentiality that clearly defined misconduct and excluded it from protection.

A *flexible culture* encourages greater teamwork and collaboration across disciplines to help maintain and improve patients’ safety under the often complex and demanding delivery of health care (Leonard, Graham, and Bonacum 2004). Kaiser Permanente and Johns Hopkins Hospital, for example, are attempting to flatten the hierarchy by training and encouraging surgical and critical care team members to “speak up for safety” when they observe an unsafe situation and to cross-check one another’s work to prevent errors. Kaiser Permanente has learned that training obstetrical teams using simulated emergencies gave them a new awareness of how their behavior affected others and built appreciation for teamwork in critical situations. Cross-cutting interventions such as the rapid response team at Missouri Baptist Medical Center promote a flexible culture by facilitating learning and information sharing across traditional organizational boundaries where breakdowns in communication and safety can often occur. These kinds of role changes may lead to what Karl Weick (2002, 193) called a “mindful interdependence” in which people “subordinate their idiosyncratic intentions to the effective functioning of the system.”

Finally, study organizations seem to be promoting a *learning culture* by undertaking system reforms based on data and knowledge gleaned from both inside and outside their local environment. Providing easy-to-learn analytic tools and training for frontline staff to draw useful conclusions and take action based on incident reports promoted a sense of local ownership for improvement and was “the single most noteworthy means of changing culture” within the Veterans Health Administration, said Dr. James Bagian, director of its National Center for Patient Safety. The VA encourages an action orientation by requiring local executives to reach an agreement with incident investigation teams on remedies that will be taken to address identified vulnerabilities. Kaiser Permanente and the OSF St. Joseph Medical Center use safety briefings and debriefings as a means of ongoing, self-guided team learning and error management. The use of risk assessment tools supports learning at OSF St. Joseph Medical Center by helping teams find weaknesses in the system and objectively weigh options for improving their reliability, thereby avoiding “quick fixes” that might actually increase harm. Sentara Norfolk General Hospital is combining direct observation of behaviors with coaching and feedback to promote the practical learning of new safety-enhancing behaviors that, over time, can become an internalized safety culture.

The organizations we studied differed in approaching culture change as an organization-wide project or through a team- or unit-based undertaking. The experience of Sentara Norfolk General Hospital suggests that a comprehensive change strategy can help accelerate the pace and scope of organizational change. Such an approach is likely to require much more upfront investment of staff time and resources. But the hospital also found that corporate principles had to be adapted and embedded in each unit’s specific work. Those taking a unit-based approach, such as Johns Hopkins Hospital, find that discrete achievements build interest and momentum for introducing change in other units. Dr. Peter Pronovost, a patient safety change leader at Johns Hopkins, explained that the dissemination of change requires a commitment to apply scientifically valid safety principles within a flexible structure that relies on local wisdom to determine improvement priorities. The intersection between unit-based and organization-wide culture change should be better understood as unit-based efforts are replicated throughout hospitals. It is likely that change will be uneven across units. Hospital managers might be able to use culture surveys and techniques like executive walk rounds to identify and focus attention on units in need of greater

improvement so as to produce a more consistent safety culture across the organization.

A fair question is how discrete efforts at improvement add up to organization-wide change. Patient safety practitioners such as Kathy Haig at OSF St. Joseph Medical Center describe a gradual process in which specific improvements produce cascading effects that build higher levels of awareness and engagement in management and the workforce. With sustained effort over several years, there is a sense of gaining traction, that management is really “walking the talk,” and that frontline staff and physicians are getting on board. Several case study organizations found that introducing improvements through small-scale tests of change helped pave the way for institutionalizing new safety practices while minimizing the risk of failure by involving staff in giving feedback at incremental stages of the implementation.

## Lessons Learned

Change agents in the case study organizations learned much from their experience implementing patient safety improvements. These lessons include:

- Apparently dramatic improvements in safety, such as the elimination of documented catheter-related bloodstream infections in the ICU and a tenfold reduction in detected adverse drug events, seem to challenge the assumption that adverse events must be tolerated as an inevitable side effect of health care.
- Safety principles and techniques developed in other industries, such as airline crew resource management training, may be applicable to health care for similar human factors issues. Simple human factors engineering approaches, such as the standardization and simplification of processes and independent checks to catch errors, often seemed to be effective. Nevertheless, knowledge and tools must be adapted to fit the culture of medicine and the particular organizational context and safety threat (Musson and Helmreich 2004).
- Safety awareness and vigilance can be taught by training and coaching staff to use practical skills, tools, and behaviors so that they gain the ability and confidence to identify safety threats and mitigate their causes, in both real-time work and later analysis. A safety culture is inculcated as these ways of systems thinking and

behaving become the norm for individuals and teams. One practical result is to greatly increase the number of events that staff regard as preventable.

- An organization's leadership can motivate and support a "bottom-up" approach to safety improvement among physician leaders and other frontline clinical staff. Some improvements require direct financial investment, and all require dedicated staff time to plan and implement. Several organizations noted the importance of repeatedly telling stories about successful improvements to introduce and reinforce desired cultural values and behaviors and to build momentum for change.
- Focusing on patients' needs can be a powerful motivator for change. Some of the organizational changes described in the cases required renegotiating traditional roles. Resistance to change was typically overcome through education on the evidence for a practice and by focusing on an intrinsic motivator—doing what is best for the patient.
- Seeking and measuring improvement in both systems (e.g., reduction of errors and vulnerabilities) and outcomes (e.g., reduction of adverse events) seems to enhance sustainability by validating clinical success factors while helping make a valid and meaningful case for patients' safety. Because many errors do not harm patients, it is important to concentrate on activities that will have the largest impact on improving safety.

## Policy Implications

What has induced the organizational leaders we studied to undertake these efforts, and are these motivations applicable to other organizations? Interviews suggest that these institutions are internally motivated to perform well. Reputational rewards appear paramount, typically to fulfill high public expectations but, in some cases, as part of a wider effort to shore up reputation. Several organizations cited the financial and operational benefits of safety improvement, such as reductions in hospital length of stay and nursing staff turnover. Accreditation requirements are viewed by these leaders as a floor on which to build. In contrast, accreditation requirements appear to be the primary driver of safety efforts in most hospitals (Devers, Pham, and Liu 2004).



Can a culture of safety in health care be encouraged so that these examples become the norm? The success of the internal mechanisms for building a safety culture in health care organizations, as described in these cases, seems more likely if it accords with the external policy forces influencing these organizations and the professionals who work in them. We offer the following observations for how policymakers in both the public and private sectors might build on intrinsic motivations to encourage a culture of safety through responsive regulation, voluntary collaboration, purchaser incentives, public reporting, consumer involvement, education, and research. Given that so little is known about safety culture, we offer our policy recommendations cautiously. Ideally, they should stimulate creative learning and continuing innovation to address evolving challenges over time.

*Link Safety Goals to Safety Culture.* The JCAHO appears to be acting as a proxy for government regulation in the safety sphere, with a stated goal of encouraging a culture of safety through continuous improvement (O'Leary 2003). In 2001 the JCAHO required that accredited institutions meet general patient safety standards such as creating a culture of safety and implementing a patient safety program. Since 2003, an evolving set of specific patient safety goals, such as establishing a medication reconciliation process, has been incorporated into accreditation requirements.

The JCAHO might capitalize on its position of influence to help health care organizations decide how they can apply specific patient safety goals to meet safety culture expectations. For example, the JCAHO might convene stakeholders to develop (and periodically update) guidance on how to create a safety culture in health care organizations based on lessons learned from leaders in the field and on practical improvement and culture change strategies that have been shown to work under particular circumstances and that can be instituted over time. Such guidance would need to be designed and used as a road map offering different routes to a common goal.

Hospitals could use safety culture guidance to structure organizational assessments for learning and improvement. Creating a repository linking assessment findings to standardized performance data and safety attitude surveys could help to identify potentially promising safety practices associated with good outcomes. Initially this could be done on a voluntary, collaborative basis. If this approach were successful, the JCAHO and its stakeholders might consider whether accreditation would be enhanced

by incorporating a safety culture assessment into the accreditation survey process, as either a standard or an optional component. Alternatively, the JCAHO might certify third-party experts or methods to perform assessments. In any case, the goal should be to improve patients' safety in ways that are responsive to local needs and priorities.

*Encourage Collaboration.* Voluntary efforts to spread evidence-based practices, such as the Institute for Healthcare Improvement's 100,000 Lives Campaign (IHI 2005b), illustrate the potential for setting bold improvement goals when stakeholders band together to sponsor and participate in an initiative. Indeed, Gosfield and Reinertsen (2005) argue that the scientific basis and wide acceptance of the campaign's goals makes them de facto national standards of care that are likely to be enforced through tort liability against hospitals that fail to undertake them. Other public-private partnership opportunities to disseminate practical knowledge and speed interorganizational learning have involved Medicare Quality Improvement Organizations (Dellinger et al. 2005), regional and statewide coalitions of stakeholders (Comden and Rosenthal 2002; Sirio et al. 2003), and recognition programs such as the Malcolm Baldrige National Quality Award and its state-level counterparts (McCarthy 2005b).

*Offer Incentives.* The financial returns from improvement often do not fully compensate health care providers for the cost of their efforts (Leatherman et al. 2003; O'Leary 2003). In response, health care purchasers—including federal and state governments, large self-insured employers, and health plans and insurers—are experimenting with pay-for-performance programs to reward health care providers for improvements in quality or attainment of quality goals (Rosenthal et al. 2004). Given the newness of incentive approaches, there is as yet little evidence of their effectiveness (Dudley et al. 2004; Galvin et al. 2005). Payment incentives might help stimulate a safety culture if enough public and private purchasers participate, the reward recognizes efforts to achieve accepted safety goals, and providers can share substantially in the savings achieved by their efforts—in other words, if rewards are perceived as real, important, and attainable. Other, simpler incentives are defraying the cost for institutions to participate in collaborative improvement initiatives (McCarthy 2005a) and offering providers a discount on malpractice liability insurance for participating in safety-enhancing activities, such as crisis management teamwork training in labor and delivery units (McCarthy and Staton 2005).

*Leverage Public Data.* Almost half the states require hospitals to report certain adverse events and incidents to a state agency, typically for the purpose of accountability (Wood and Nash 2005). Although in the past these data often were not systematically collected or analyzed, recently a few states have created patient safety centers to analyze data, educate health care providers and the public, foster collaboration, and stimulate a culture of safety (Rosenthal and Booth 2004). If experience shows that such centers are able to use state reporting data to disseminate new information about critical safety threats and promote worthwhile improvements, then their creation should be encouraged. The aviation industry's experience suggests that a centralized safety reporting system can improve safety awareness if it is nonpunitive, confidential, independent, and easy to use and it produces timely, expert, and systems-oriented feedback (Leape 2002). The newly enacted federal Patient Safety and Quality Improvement Act may contribute to the achievement of these goals by protecting the voluntary, confidential reporting of safety data to independent, federally certified patient safety organizations.

A few states now publicly report hospital-specific data on certain adverse events or hospital-acquired infections (IDSA 2005; Marchev, Rosenthal, and Booth 2003), which supporters advocate as both a matter of the public's right to know and a means to empower consumer choice and induce improvement. The public reporting of hospital-specific clinical quality data has been associated with better quality of care (Hibbard, Stockard, and Tusler 2005). Adverse event rates, however, might not be comparable if a higher rate reflects better reporting rather than worse quality. Moreover, some hospital leaders fear that nonconfidential public reporting might discourage internal error reporting (Weissman et al. 2005). The publication of process measures, such as the Leapfrog Group's voluntary survey of hospital compliance with recognized safety practices, appears to be more widely accepted.

*Involve Consumers.* Consumers have a potentially compelling stake in promoting a culture of safety in health care (NPSF 2003), but efforts in this regard are still nascent. The federal government, the JCAHO, advocacy groups, and hospitals are encouraging patients to be vigilant about their care and assertive in protecting themselves from errors. Patients may need education and coaching to gain the understanding and confidence needed to take recommended actions, such as questioning their health care professional (Hibbard et al. 2005). Some hospitals are including patients in interdisciplinary rounds held at the bedside to

increase the detection of errors (Uhlig et al. 2002). Other hospitals, such as the Dana-Farber Cancer Institute, recruit patients to serve on Patient and Family Advisory Councils that help design and evaluate organizational policies, systems, and quality improvement initiatives (Ponte et al. 2003). Respect for patients and a desire to maintain their trust demand that hospitals and health professionals disclose the occurrence of adverse events to affected patients and their families. Current disclosure practices may not be adequately meeting patients' desire for an honest accounting and emotional support (Gallagher et al. 2003).

*Advance Education and Research.* Medical and nursing education are essential to shaping health care professionals' safety-related attitudes and behaviors by instilling an understanding of systems thinking about error and an appreciation for human factors such as teamwork and communication that can help keep patients safe. Federal funding for the Agency for Healthcare Research and Quality is vital to support research on safety culture and for the development of valid metrics and tools with which to measure and promote it (Clancy 2005). To help guide policy, new research is needed on how specific policy actions influence organizational behaviors and safety outcomes.

## Conclusions

Organizational leaders in patient safety are undertaking various interventions to instill a safety culture, and the organizations we studied view culture change as a key element and accomplishment of their safety improvement efforts. These organizations appear to view safety culture as an aspirational system property that is more than the sum of their individual safety improvement efforts. The reason for this outlook appears to be a belief that a sustained safety culture allows continuing innovation and improvement that will transcend whatever particular safety methodology is used at any particular time.

The cases describe many impressive results, but they do not permit us to draw firm conclusions about the effects of culture vis-à-vis other potential causal explanations for the observed outcomes. All the case study organizations were part of integrated health care systems or multihospital systems that might offer advantages, such as greater in-house expertise, physician commitment, and financial resources for carrying out organizational change strategies. Nevertheless, the changes described

are not beyond the reach of independent institutions. We examined other cases in which community hospitals made similar safety improvements when they were part of a supportive learning collaboration (McCarthy 2004).

Creating an organizational culture of safety may be both foundational to safety improvement and elusive as a goal. The process of instilling a safety culture requires the integration of both systems engineering and social engineering skills. A paradoxical insight is that the adoption of specific improvements both furthers—and is furthered by—organization-wide culture change. All the tools and techniques described in these case studies display promise in promoting a culture of safety when used as part of an intentional strategy to move the organization toward that goal. Yet as James Reason (1997) warned, safety improvement tools and techniques are not pieces of machinery that can simply be plugged in, turned on, and then forgotten. Rather, they are part of an organic organizational growth process that must be nurtured over a prolonged period of time.

Perhaps the most sobering discovery from our cases is that those who are furthest along the patient safety pathway report that their learning has made them realize how much more they need to accomplish to achieve a truly safe environment for patients. A question for practitioners, policy-makers, and researchers is whether the kinds of approaches described here will provide the impetus to change the culture of health care in positive and enduring ways. Because of the dynamic and emergent nature of the safety field in health care, ongoing assessment will be valuable to take stock of progress and new learning as experience accumulates over time.

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